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10/574,177	03/30/2006	Patrick Chaton	288708US2PCT	4057

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EXAMINER	
ALLI, IYABO	

ART UNIT	PAPER NUMBER
2877	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/574,177	CHATON ET AL.	
	Examiner	Art Unit	
	IYABO S. ALLI	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 March 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/27/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see Remarks on pages 9-12, filed on April 21, 2008, with respect to the rejection(s) of claim(s) 1-44 under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of **Brongersma**.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims **23-38** and **45-53** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Brongersma** (7,088,449) in view of **Lee et al.** (2004/0038307). (**'Lee'**)

As to claim 23, Brongersma discloses pads **305** distributed on the surface of a support **307** (Column 6, lines 38-41 and Fig. 3), the pads **305** including at least one electrically conductive material (Column 5, lines 45-48 and Figs. 2 & 3).

Brongersma *fails to disclose* pads configured to immobilize the chemical or biological species having a dimension less than 1μm.

However, **Lee** teaches pads configured to immobilize the chemical or biological species having a dimension less than 1μm. (Page 21, Paragraph 192).

It would have been obvious to one skilled in the art at the time of the invention to include the configuration of the pads of **Lee** in the sensor system of **Brongersma** in order to produce more pads on a smaller surface, increasing the amount of particles able to be detected on the substrate surface.

As to claim 24, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 23 above, **in addition Brongersma** discloses the pads **305** are distributed on the surface **307** of the support according to a two-dimensional matrix (Column 5, lines 45-48 and Figs. 2 & 3).

As to claim 25, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 23 above **in addition Brongersma** discloses the pads **305** have a section in a shape of a circle or an ellipse (Fig. 3).

As to claim 26, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 25 above, **except for** the section of the pads have its largest dimension between 0.5μm and 1μm.

However, **Lee** teaches the section of the pads have its largest dimension between 0.5μm and 1μm (Page 21, Paragraph 192).

It would have been obvious to one skilled in the art at the time of the invention to include the dimension size of the pad of **Lee** in the sensor system of **Brongersma** in

order to produce more pads on a smaller surface, increasing the amount of particles able to be detected on the substrate surface.

As to claim 27, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 25 above, **except for** the section of the pads have its largest dimension less than 0.5μm.

However, **Lee** teaches the section of the pads have its largest dimension less than 0.5μm (Page 21, Paragraph 192).

It would have been obvious to one skilled in the art at the time of the invention to include the dimension size of the pad of **Lee** in the sensor system of **Brongersma** in order to produce more pads on a smaller surface, increasing the amount of particles able to be detected on the substrate surface.

As to claim 28, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 23 above, **except for** at least first and second networks of pads.

Although **Brongersma** in view of **Lee *fails to disclose*** the shape of a section of the pads of the first network being different from a shape of a section of pads of the second network, it would have been obvious to one skilled in the art at the time of the invention to know that the shape of the pads in each network will vary, if the depositing component is not equipped to deposit identical and uniform pads on the substrate surface.

As to claim 29, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 23 above, **in addition Brongersma** discloses the electrically conductive material is gold or silver (Column 3, lines 52-56).

As to claim 30, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 23 above, **in addition Brongersma** the pads **305** are formed by superposition of at least two different metallic layers (Column 3, lines 52-56).

As to claim 31, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 23 above, **except for** the pads are formed by superposition of a metallic layer integral with the support and an ultra thin layer of a material enabling attachment of the chemical or biological species.

However, **Lee** teaches the pads are formed by superposition of a metallic layer integral with the support and an ultra thin layer of a material enabling attachment of the chemical or biological species (Page 12, paragraph 119).

It would have been obvious to one skilled in the art at the time of the invention to include the metallic layer of **Lee** in the sensor system of **Brongersma** in order to allow various wavelengths to be evaluated depending on the index of refraction of the layer on the surface of the object under test for comparative techniques.

As to claim 32, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 23 above, **in addition Brongersma** discloses the surface **307** of the support is a surface **307** of a material chosen among dielectric materials, semiconductor materials, and metallic materials (Column 3, lines 52-56).

As to claim 33, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 23 above, **except for** means for increasing sensitivity of the sensor.

However, **Lee** teaches means for increasing sensitivity of the sensor (Page 22, paragraph 201).

As to claim 34, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 33 above, **except for** the means for increasing the sensitivity of the sensor including a thin metallic film deposited on the surface of the support.

However, **Lee** teaches the means for increasing the sensitivity of the sensor including a thin metallic film deposited on the surface of the support (Page 21, paragraph 191).

As to claims 33 and 34 above, it would have been obvious to one skilled in the art at the time of the invention to include the sensitivity enhancement of **Lee** in the sensor system of **Brongersma** in order to be detect even the smallest shift in reflected light from the layers on the surface of the object under test, to determine if the thickness of the layers are even and uncontaminated.

As to claim 35, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 34 above, **except for** a thin dielectric film is intercalated between the thin metallic film and the pads to adjust plasmon resonance as a function of thickness of the dielectric layer.

However, **Lee** teaches a thin dielectric film is intercalated between the thin metallic film and the pads to adjust plasmon resonance as a function of thickness of the dielectric layer (Page 21, Paragraphs 192).

It would have been obvious to one skilled in the art at the time of the invention to include the dielectric film of **Lee** in the sensor system of **Brongersma** in order to allow various wavelengths to be evaluated depending on the index of refraction of the layer on the surface of the object under test for comparative techniques.

As to claim 36, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 33 above, **except for** the means for increasing the sensitivity of the sensor includes a planer wave guide configured to convey a guided electromagnetic mode, the planar wave guide being formed on the surface or under the surface of the support and under the pads.

However, **Lee** teaches the means for increasing the sensitivity of the sensor includes a planer wave guide configured to convey a guided electromagnetic mode, the planar wave guide being formed on the surface or under the surface of the support and under the pads (Page 22, paragraph 201).

As to claim 37, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 33 above **except for** the means for increasing the sensitivity of the sensor is constituted by grouping together of pads, a distance separating the grouped together pads being sufficiently small to allow an electromagnetic coupling between the grouped together pads.

However, **Lee** teaches the means for increasing the sensitivity of the sensor is constituted by grouping together of pads, a distance separating the grouped together pads being sufficiently small to allow an electromagnetic coupling between the grouped together pads (Page 19, Paragraph 180).

As to claims **36** and **37**, it would have been obvious to one skilled in the art at the time of the invention to include the increasing means of **Lee** in the sensor system of **Brongersma** in order to detect even the smallest shift in reflected light from the layers on the surface of the object under test, to determine if the thickness of the layers are even and uncontaminated.

As to claim 38, Brongersma in view of **Lee** discloses all of the claimed limitations, as applied to Claim 33 above, **in addition Brongersma** discloses the pads **305** having a section in a form of an ellipse (Fig. 3).

Brongersma fails to disclose the means for increasing the sensitivity of the sensor is constituted by a small distance separating an end of a pad along the major axis of the ellipse from the end of the adjacent pad along the major axis of the ellipse, this small distance enabling an electromagnetic coupling between the pads.

However, **Lee** teaches the means for increasing the sensitivity of the sensor is constituted by a small distance separating an end of a pad along the major axis of the ellipse from the end of the adjacent pad along the major axis of the ellipse, this small distance enabling an electromagnetic coupling between the pads (Page 22, paragraph 201).

It would have been obvious to one skilled in the art at the time of the invention to include the increasing means of **Lee** in the sensor system of **Brongersma** in order to detect even the smallest shift in reflected light from the layers on the surface of the object under test, to determine if the thickness of the layers are even and uncontaminated.

As to claim 45, Brongersma in view of **Lee** discloses all of the claimed limitations, as applied to Claim 23 above, **except for** wherein each of said pads has a surface that sustains surface plasmons at a first plasmon resonance wavelength when said chemical or biological species are not immobilized on said surface and sustains surface plasmons at a second plasmon resonance wavelength when said chemical or biological species are immobilized on said surface, wherein said first and second resonance wavelengths are shitted from each other by a detectable amount.

However, **Lee** teaches wherein each of said pads has a surface that sustains surface plasmons at a first plasmon resonance wavelength when said chemical or biological species are not immobilized on said surface and sustains surface plasmons at a second plasmon resonance wavelength when said chemical or biological species are immobilized on said surface, wherein said first and second resonance wavelengths are shitted from each other by a detectable amount (Page 21, paragraph 194).

It would have been obvious to one skilled in the art at the time of the invention to include the plurality of wavelengths of **Lee** in the sensor system of **Brongersma** in order to allow comparative techniques to be carried out when determining if the total

reflection from the entire surface of the object under test compares to stored characteristic data.

As to claim 46, Brongersma in view of **Lee** discloses all of the claimed limitations, as applied to Claim 23 above, **except for** wherein said first and second resonance wavelengths are shifted by an amount detectable by Raman spectroscopy.

However, **Lee** teaches wherein said first and second resonance wavelengths are shifted by an amount detectable by Raman spectroscopy (Page 15, paragraph 148 and Fig. 3).

As to claim 47, Brongersma in view of **Lee** discloses all of the claimed limitations, as applied to Claim 23 above, **except for** wherein said surface of each of said pads sustains localized surface plasmons at said first and second plasmon resonance wavelengths, wherein said localized surface plasmons propagate on said surface over distances less than a wavelength of a light exciting said localized surface plasmons on said surface.

However, **Lee** teaches wherein said surface of each of said pads sustains localized surface plasmons at said first and second plasmon resonance wavelengths, wherein said localized surface plasmons propagate on said surface over distances less than a wavelength of a light exciting said localized surface plasmons on said surface (Page 21, paragraph 194).

As to claims **46** and **47**, it would have been obvious to one skilled in the art at the time of the invention to include the plurality of wavelengths of **Lee** in the sensor system

of **Brongersma** in order to allow comparative techniques to be carried out when determining if the total reflection from the entire surface of the object under test compares to stored characteristic data.

As to claim 48, Brongersma in view of **Lee** discloses all of the claimed limitations, as applied to Claim 23 above, **in addition Brongersma** discloses wherein each of said pads **305** has a cylindrical shape of circular or elliptic section (Fig. 3).

As to claim 49, Brongersma in view of **Lee** discloses all of the claimed limitations, as applied to Claim 23 above, **in addition Brongersma** discloses wherein each of said pads **305** has a circular section (Fig. 3).

As to claim 50, Brongersma in view of **Lee** discloses all of the claimed limitations, as applied to Claim 23 above, **except for** wherein each of said pads has a diameter from 0.5 to 1 gm and a height from 20 to 500 nm, and wherein said pads have centers spaced from each other at a distance of 5 gm to 300 gin.

However, **Lee** teaches wherein each of said pads has a diameter from 0.5 to 1 gm and a height from 20 to 500 nm, and wherein said pads have centers spaced from each other at a distance of 5 gm to 300 gin (Page 21, paragraph 192).

As to claim 51, Brongersma in view of **Lee** discloses all of the claimed limitations, as applied to Claim 23 above, **except for** wherein each of said pads has a diameter from 20 to 100 nm and a height from 10 to 20 nm, and wherein said pads are spaced from each other at a distance of 100 nm to 500nm.

However, **Lee** teaches wherein each of said pads has a diameter from 20 to 100 nm and a height from 10 to 20 nm, and wherein said pads are spaced from each other at a distance of 100 nm to 500nm (Page 21, paragraph 192).

As to claims **50** and **51 above**, It would have been obvious to one skilled in the art at the time of the invention to include the size of the pads of **Lee** in the sensor system of **Brongersma** in order to produce more pads on a smaller surface, increasing the amount of particles able to be detected on the substrate surface, But allowing them to be evenly space and distributed on the surface of the object under test.

As to claim 52, Brongersma in view of **Lee** discloses all of the claimed limitations, as applied to Claim 23 above, **in addition Brongersma** discloses wherein a first plurality of said pads **305** has a circular section and a second plurality of said pads **305** has an elliptical section (Fig. 3).

And as to claim 53, Brongersma in view of **Lee** discloses all of the claimed limitations, as applied to Claim 23 above, **except for** wherein a first plurality of said pads are geometrically configured so as to sustain surface plasmons at a first plasmon resonance wavelength when said chemical or biological species are immobilized on said pads of said first plurality, and a second plurality of said pads are geometrically configured so as to sustain surface plasmons at a second plasmon resonance wavelength when said chemical or biological species are immobilized on said pads of said second plurality, wherein said first and second plasmon resonance wavelengths are different from each other.

However, **Lee** teaches wherein said surface of each of said pads sustains localized surface plasmons at said first and second plasmon resonance wavelengths, wherein said localized surface plasmons propagate on said surface over distances less than a wavelength of a light exciting said localized surface plasmons on said surface (Page 21, paragraph 194).

It would have been obvious to one skilled in the art at the time of the invention to include the plurality or wavelengths of **Lee** in the sensor system of **Brongersma** in order to allow comparative techniques to be carried out when determining if the total reflection from the entire surface of the object under test compares to stored characteristic data.

4. Claims **39-42 and 44** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Brongersma** (7,088,449) in view of **Lee et al.** (2004/0038307), and further in view of **Chee et al.** (7,226,734). (**'Lee'** and '**Chee'**)

As to claim 39, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 33 above, **except for** the means for increasing the sensitivity of the sensor includes at least one particle associated with a pad.

However, **Chee** teaches the means for increasing the sensitivity of the sensor includes at least one particle associated with a pad (Column 23, lines 50-53).

It would have been obvious to one skilled in the art at the time of the invention to include the use of at least one particle of **Chee** in the increasing means of **Brongersma**

in order to provide an obvious detection area with a noticeable marker when the sensing portion take places.

As to claim 40, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 39 above, **except for** the at least one particle is chosen from the group composed of metallic particles and fluorescent particles.

However, **Chee** teaches the at least one particle is chosen from the group composed of metallic particles and fluorescent particles (Column 23, lines 58-63).

As to claim 41, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 39 above, **except for** the at least one particle is a particle fixed to the chemical or biological species.

However, **Chee** teaches the at least one particle is a particle fixed to the chemical or biological species (Column 50, lines 45-50).

As to claim 42, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 39 above, **except for** the at least one particle is fixed to an object intended to be placed near to a pad.

However, **Chee** teaches the at least one particle is fixed to an object intended to be placed near to a pad (Column 50, lines 45-50).

It would have been obvious to one skilled in the art at the time of the invention to include the particle of **Chee** in the sensor system of **Brongersma** in view of **Lee** in

order to provide an easier detection area and obvious marker when the sensing portion of the system take place.

And as to claim 44, Brongersma in view of **Lee** discloses all of the claimed limitations as applied to Claim 23 above, **except for** the use of the microsensor or the nanosensor to carry out Raman spectroscopy at a level of detection by a reading system for identification of the chemical or biological species immobilized on the pads of the microsensor or the nanosensor.

However, **Chee** teaches the use of the microsensor or the nanosensor to carry out Raman spectroscopy at a level of detection by a reading system for identification of the chemical or biological species immobilized on the pads of the microsensor or the nanosensor (Column 51, lines 13-18).

It would have been obvious to one skilled in the art at the time of the invention to include the Raman spectroscopy of **Chee** in the sensor system of **Brongersma** in view of **Lee** in order to enhance the measuring surface when detecting alterations in the optical signature of the particles.

5. Claim **43** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Brongersma** (7,088,449) in view of **Lee et al.** (2004/0038307), as applied to claim 42 above, and furthermore in view of **Pohl** (5,461,600). **('Lee')**

As to claim 43, Brongersma in view of **Lee** discloses all of the claimed limitations, as applied to Claim 39 above, **except for** the object is the tip of a near field optical microscope.

However, **Pohl** teaches the object is the tip of a near field optical microscope (Column 5, lines 11-16).

It would have been obvious to one skilled in the art at the time of the invention to include the microscope of **Pohl** in the sensor system of **Brongersma** in view of **Lee** in order effectively deposit particles in the desired area of the pad networks as known from near-field microscopy.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IYABO S. ALLI whose telephone number is (571) 270-1331. The examiner can normally be reached on M-Fr: 7:30am- 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Toatley can be reached on 571-272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

IYABO S. ALLI
Examiner
Art Unit 2877
August 1, 2008 /I. S. A./

/L. G. Lauchman/
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